

September 13, 2010

BY HAND DELIVERY AND ELECTRONIC FILING

Julius Genachowski
Chairman
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

**Re: White Spaces/Sensing/Geolocation Database
ET Docket Nos. 04-186, 02-380, 08-260**

Dear Chairman Genachowski:

In response to requests to various Commission officials, US Army Communications-Electronics Research Development and Engineering Center (CERDEC) respectfully suggests that the FCC maintain the spectrum sensing requirement associated with the Commission's rules for the use of unlicensed devices in the TV Band¹.

We urge that the Commission adhere to its decision that spectrum sensing is a necessary component of the regulations and a valuable adjunct to the geolocation/ database requirement². The two together are essential in achieving the Commission's stated goal of avoiding harmful interference to the licensed incumbent services operating in these bands. This is so for several reasons: (1) sensing serves as an important backstop to compensate for the inevitable database errors and potential security issues in the geolocation /database process; (2) sensing would limit interference into TV Band operations to a short period of time; (3), in the case of mobile devices, such as licensed microphones used for newsgathering and public purposes, geolocation protection is not even possible; (4) sensing allows detection and verification of an interfering signal which is impossible using a database alone; (5) sensing will ensure the avoidance of harmful interference between commercial and government users, an issue highly critical to DoD which is pursuing the development of technology (Software Defined Radio, Joint Tactical Radio Systems, etc.) for operations in shared bands.

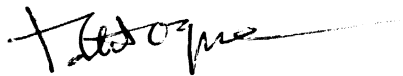
US Army CERDEC has been engaged in Cognitive Radio Technology development and deployment for many years. We have been engaged in IEEE 802 Standards activities (IEEE 802.22 Wireless Regional Area Networks and IEEE 802.16 Wireless Metropolitan Area Networks) and would like to leverage commercial standards for various military applications. In particular, the IEEE 802.22 Standard which proposes to use Cognitive Radio Technology in the TV Whitespaces is of importance to us³.

Counter to the belief that it is difficult to reliably meet the spectrum sensing thresholds as proposed by the FCC's proposed rules (FCC Docket # 08-260)⁴, many companies (e.g. Insitute for Infocom Research (I2R)⁵, Thomson⁶, and Philips⁷) have shown and implemented algorithms which are capable of sensing the recommended signal types both reliably and at the thresholds specified in the FCC proposed rules^{8,9}.

As suggested by Commissioner Meredith Baker, spectrum sensing has the potential to help maximize our use of available spectrum, and make possible applications and devices that are not feasible with the database alone¹⁰. A regulatory push to include spectrum sensing technologies will ensure adequate protection against harmful interference to the critical communications services which are used for the Department of Defense (DoD) and Department of Homeland Security (DHS) applications. Inclusion of spectrum sensing will also allow these technologies to be deployed in scenarios that are important for military applications.

Hence, we urge the FCC to maintain the spectrum sensing requirements as proposed in the Document FCC Docket # 08-260.

Respectfully submitted,



Dr. Mahbub Hoque
Chief Scientist and Division Chief,
Antennas and Spectrum Analysis Division
Space and Terrestrial Communications Directorate (S&TCD)
US Army – RDECOM CERDEC, Fort Monmouth, NJ
mahbub.hoque@us.army.mil

cc: Commissioner Michael J. Copps
Commissioner Robert M. McDowell
Commissioner Mignon Clyburn
Commissioner Meredith Atwell Baker
Julius Knapp
Bill Lake
Jennifer Flynn
John Giusti and Joshua Cinelli
Angela Giancarlo
Brad Gillen and Charles Mathias
Eloise Gore and Louis Peraertz

¹ See *Unlicensed Operation in the TV Broadcast Bands*, Second Report and Order and Memorandum Opinion and Order, ET Docket Nos. 04-186 and 02-380, 08-260.

² MSTV, NAB, Shure, Shared Spectrum, Philips, and others have supported retaining the sensing requirement. See, e.g., Ex Parte Comments of MSTV, ET Docket Nos. 04-186 and 02-380 (July

16, 2010).

³ IEEE 802.22 Standard on Wireless Regional Area Networks – Using Cognitive Radio Technology – www.ieee802.org/22

⁴ Supporters of eliminating sensing have offered no evidence or support for their position except to state that such devices would be cheaper to produce.

⁵ Zeng, Yonghong, et al. “Text on Covariance-based sensing for Wireless Microphone – For Informative Annex on Sensing Techniques”, Institute for Infocom Research, July 2007, <https://mentor.ieee.org/802.22/dcn/07/22-07-0295-03-0000-text-on-covariance-based-sensing-for-wireless-microphone.doc>

⁶ Chen, Hou-Shin, et al. “Improved Cyclostationary based sensing algorithms”, Thomson Inc., July 2007, <https://mentor.ieee.org/802.22/dcn/07/22-07-0361-01-0000-thomson-improved-cyclostationarity-based-sensing.ppt>

⁷ Ghosh, Monisha, “Text on FFT-based pilot sensing – For Informative Annex on Sensing Techniques”, June 2007, <https://mentor.ieee.org/802.22/dcn/07/22-07-0298-01-0000-text-on-fft-based-pilot-sensing.doc>

⁸ A. Mody, “Spectrum Sensing of DTV in the Vicinity of the Pilot Using Higher Order Statistics,” <https://mentor.ieee.org/802.22/dcn/07/22-07-0370-03-0000-text-on-dtv-spectrum-sensing-using-hos-bae-systems.doc>

⁹ B. Fette, Cognitive Radio Technology, Elsevier, 2009 – Book Chapter by Spooner and Nicholls, Spectrum Sensing Based on Spectral Correlation

¹⁰ http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-298832A1.pdf